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ELECTRONIC CAMERA
[Denshi Kamera]

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Specifications

1. Title of the Invention

ELECTRONIC CAMERA

2. Claims

(1) An electronic camera that stores still image signals in a specific memory area on a memory card located in the semiconductor memory that were received via photographic commands, and that is comprised of a power source on the electronic camera main unit, a power supply means to split this power in multiple ways and a control means to control the power supply and power interruption from the power supply means.

(2) The electronic camera as claimed in Claim 1, comprised of an image data storage part that stores the still image signals for at least one picture, and that starts the power supply from the power supply means via the ready photo signal, so that when storage of at least one picture to the image data storage part has been completed, the control means interrupts the power supply.

3. Detailed Explanation of the Invention

[Industrial Field of the Invention]

The present invention relates to an electronic camera that stores still images using a memory card as the recording medium.

[Existing Art]

Recently the market has seen electronic cameras that perform photographing and recording of still images via solid photographic elements such as CCD (charge coupled device) and rotating magnetic medium instead of the existing (still) camera that photographs and

records still images via photosensitive photographic film. However, this type of electronic camera employs rotating magnetic medium and so requires a camera containing a driver to drive the recording head of the rotating magnetic medium, and so it is difficult for this type of camera to be compact. For a compact system that does not require a driver, it is imperative to develop a solid electronic camera system that records image signals on a memory card using semiconductor memory.

There are many cases that use memory within the structure of a digital signal processing method for this type of digital electronic camera.

Temporary storage for delayed and efficient data compression that creates signals for luminance and color or temporary storage for storage conversion to memory cards is employed at the present time. Analog electronic cameras employ real-time writing while if the data for one image is written to a buffer memory on digital electronic cameras, the subsequent processing time is free.

This type of digital electronic camera naturally is battery driven, and requires circuits and a system that uses small amounts of energy. Since the battery capacity is pre-determined, integrated operation for each hour reduces the supply voltage and erroneous operations also occur.

[Problems this Invention is to Solve]

Relative to the digital electronic camera discussed above, the present invention is an electronic camera that consumes small amounts of energy so is durable even with a small battery and avoids concentration of time on specific operations, so the supply voltage is

not drained.

[Structure of the Present Invention]

4. [Means of Solving these Problems]

The present invention is for an electronic camera comprised of a means to store data for at least one image, a primary power supply means that conducts the power supply to the control unit that controls the entire electronic camera via a power switch connected to the electronic camera body, and a secondary power supply means that starts and stops the power supply to the relevant parts via a control command.

5. [Operation]

The battery supplies power to a plurality of power circuits and each is connected to the power switch on the camera body. These power circuits supply power to the control unit, which controls the entire camera. This includes the power supply to the relevant parts of other power circuits and stop commands.

6. [Embodiments]

Next is a description of the embodiments for the present invention, using the figures as references.

7. Figure 1 is a block drawing showing the digital signal processing for the digital electronic camera for the first embodiment in the present invention. In this figure, the power unit 100 is also shown with dotted lines as the power supply. CCD 1 drives the CCD driver **10** and the output is amplified by the amp **2** while signal processing is conducted by the analog signal processor **3**. White balance and γ correction is performed here. Next, signals digitized by the AD converter **4** are stored on the buffer frame memory **6** after being

subject to signal processing by the digital signal processor **15**. This buffer frame memory **6** is prepared for image data for at least one image. The data read from this buffer frame memory **6** is subject to signal processing by the digital signal processor **2 7** [sic.] and stored to a specific location on the memory card **9** via the memory card interface **8**. This memory card **9** is removable and can include a volatile semiconductor memory and battery, or a non-volatile semiconductor memory, or both. With this structure, data is written on a temporary buffer frame memory **6**, so the signal processing system up to that point, specifically the CCD 1~digital signal processor **1 5** [sic.] and CCD driver **10** are not necessary.

After data is written to the buffer frame memory **6**, power supplied to the CCD1, CCD driver **10**, amp **2**, analog signal processor **3**, AD converter **4** and digital signal processor 15 from power circuit **1 11** [sic.] on the control system via the write completion signal A stops the power supplied to each part. The battery is efficiently utilized in this manner. Power supply to the remaining parts including the control system and the memory card is performed by the power circuit **1 11** and the other power circuit **2 12** connected to the power switch on the electronic camera body. The command to stop power supply to this power circuit **1 11** is sent by the control system **13**. While photographing, the ready photographic signal and shutter signal are prepared for input to the control system **13** and when the ready photographic signal is input, the power circuit **1 11** starts supplying each part with power without requiring any other power consumption.

8. Figure 2 is a structural diagram of the system that stops supplying power to each part of the power circuit **2** corresponding to

the power to the memory card interface from the buffer memory when writing to the memory card is completed. In this case, the power circuit **3** **16** is connected to the power switch of the electronic camera body and the control system **13** receiving the power supply, and the control system **13** that receives the power supply controls the power circuit **1** **11** and **2** **15**.

9. Figure 3 is nearly identical to the example in Fig. 2 but also has a power supply for writing when writing to the EPROM or E2PROM memory card is required. This is an example of such supply from power circuit **2** **17**.

In each of these cases, other unnecessary operations are not performed when the CCD unit operates while writing to the memory card so it is possible to conduct stable photographing without a reduction in the battery voltage.

Various positions for the buffer frame memory **6** can be considered. A description for a specific example of the digital signal processor **1**, **2** is provided.

10. Figure 4 is an example of the configuration immediately after the AD converter. The data read from the buffer memory is subject to digital signal processing such as luminance signal processing, color signal processing and data compression, and then stored on the memory card. In this case, the role of the buffer frame memory is to convert the differences in processing speeds, and considers field/frame conversion of the frame image written for the field image. Field/frame conversion is required when using this camera as a video camera.

11. Figure 5 shows an example prior to data compression and data compression such as DCT (discrete cosine transform) is required to

efficiently perform temporary data storage.

12. Figure 6 shows an example before the memory card interface part. The memory card interface includes the form and timing functions relevant for writing image data to the memory card. A buffer frame memory may be necessary for these functions.

In some cases, processing may not be necessary for the digital signal processing **1**, **2** shown in Figs. 1~3.

13. [Effect of this Invention]

As clearly shown in the description above, the power unit is separated into multiple units, enabling tight control of the power supply to the power for each relevant part. This extends the life of the battery and avoids erroneous operation.

14. Brief Description of the Figures

Figure 1 is a conceptual block drawing of the electronic camera for the first embodiment in the present invention. Figure 2 and Figure 3 are conceptual block drawings of the electronic cameras for other embodiments of the present invention. Figures 4~6 are each block drawings showing the positions of each buffer frame memory position.

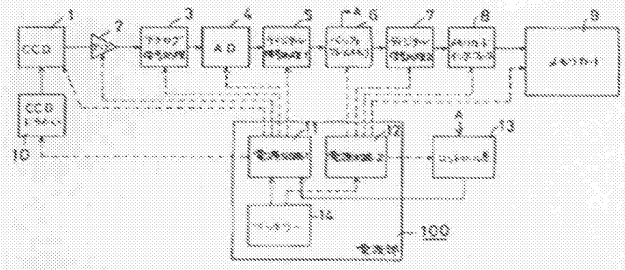

Figure 1
2 amp
3 analog signal processor
5 digital signal processor
6 buffer frame memory
7 digital signal processor 2
8 memory card interface
9 memory card
10 CCD driver
11 power circuit 1
12 power circuit 2
13 control system
14 battery
100 power unit

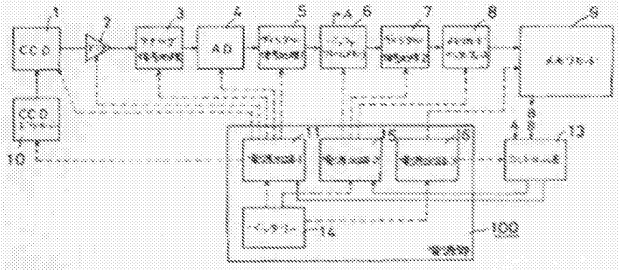

Figure 2
2 amp
3 analog signal processor
5 digital signal processor
6 buffer frame memory
7 digital signal processor 2
8 memory card interface
9 memory card
10 CCD driver
11 power circuit 1
15 power circuit 2
16 power circuit 3

13 control system
14 battery
100 power unit

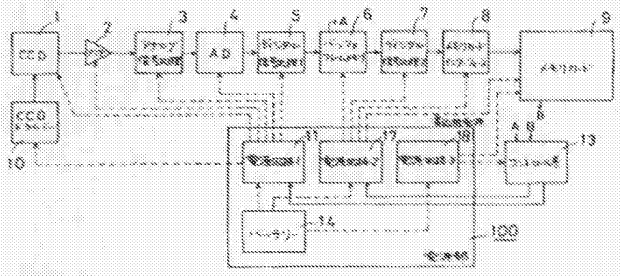

Figure 3
2 amp
3 analog signal processor
5 digital signal processor
6 buffer frame memory
7 digital signal processor 2
8 memory card interface
9 memory card
10 CCD driver
11 power circuit 1
17 power circuit 2
18 power circuit 3 power for writing
13 control system
14 battery
100 power unit

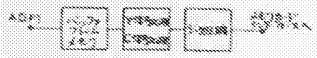

Figure 4

From AD
Buffer frame memory
Y signal processor
C signal processor
Data compression
To memory card interface

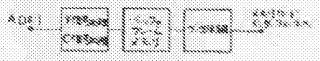

Figure 5

From AD
Y signal processor
C signal processor
Buffer frame memory
Data compression
To memory card interface

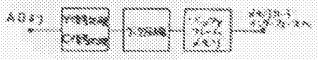

Figure 6

From AD
Y signal processor
C signal processor
Data compression
Buffer frame memory
To memory card interface